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‘There is worse to come’: The biopolitics of traumatism in Antimicrobial Resistance (AMR)

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Introduction

In July 2014, the then British Prime Minister publicly articulated his fears of a ‘return to the dark ages of medicine’, an ‘unthinkable scenario’ in which antibiotics would become useless in tackling even the most common of minor infections. Cameron sketched out the dystopian prospect of a ‘return’ to the past, the unravelling or ‘undoing’ of modernity’s promissory progress. Exactly a decade earlier, Cameron’s predecessor as leader of the British Conservatives (Michael Howard), presented ‘superbugs’ as symptomatic of a fundamental cultural and economic contaminant at the heart of British politics and institutional life. Britain had become ‘the sick man of Europe’ he argued and only liberal market economic reforms could restore Britain once again to health. This paper focuses on these and other aspects of the recent politics of anti-microbial resistance (AMR) examining the seemingly the dystopian capacity of infectious diseases to evolutionarily adapt to and ‘outpace’ the toxins developed to keep them at bay. In so doing, we explore the promissory work of ‘traumatism’ (Derrida 1999, 2003) and the politics of fear through which the debate has become expressed.

Conceptually, we locate AMR in recent biopolitical literature on immunity, anticipatory biopolitics and the sociology of futures. We will argue that the debate has become a significant vehicle for the expression of an ‘economic imaginary’ (Jessop and Oosterlynck 2008) where microbial resistance is projected onto the ideal operations of neoliberal markets. We bring this focus on economic imaginary together with writing on anticipation and an immunitary perspective on biopolitics. Immunitary theory allows us to recognise the importance of the immune system in configuring, and being configured by, the cross-currents of politics and life science debate. Some perspectives articulate the affirmative prospect of a ‘co-immunity’ between the self and the immunitary other, the human and the microbial (Cohen 2009). Sloterdijk reflects on the consequences of the fortified immunitary microspheres of contemporary technological securitisation (2011).

In following the economic imaginaries of AMR, we document an ongoing traffic in meanings by which, biology and the juridical, immunology and economic politics, restructure one another (Martin 1994; Cohen 2009; Jamieson 2015). Our focus here is to trace the transformation of one epistemology (biological resistance) into another (the political economy of markets). This, we suggest, can be expressed as the ‘resistance of economies’ (Brown and Nettleton 2017). Less explored here are what we have called ‘economies of resistance’, or the way principles of economy are borrowed into biological explanations of AMR.

Biological models of 'genetic capitalism' in AMR nicely illustrate the flow of political economy into biology (*ibid*). The wider task to which this critique contributes, is to puzzle through the mutually constituting flows between 'economies of resistance' and the 'resistance of economies' in the politics of AMR.

Our key anchor point for thinking about the anticipatory dimensions of the AMR debate is Derrida and his reflections on the links between immunity and terror (2003). For Derrida, our present protections create the circumstances for an inescapably destructive future autoimmunity. His thinking is focussed on the role of the imagination and chimes with the dystopian catastrophism underpinning many recent political and policy interventions on AMR. He reflects on an 'anticipatory catastrophism' and an 'immunitary imagination' that feeds a projected future cycle of excess recoiling destructively back upon our current protections and defences.

Our point is to consider the different kinds of futures being constructed through the politics and policy of antimicrobial resistance especially in its catastrophist formulations (see also Nerlich and James 2009; Brown and Crawford 2009). We will explore the very different accounts of 'resistance' expressed at different moments in the development of the AMR debate and interrogate to what extent AMR is a site for the continuation or transformation of an immunitary politics at the intersections of the human and the microbial. We use the political interventions of Howard and Cameron as opportunities to consider the different kinds of futures being constructed through the promissory performance of biotic resistance.

This then is as an opportunity to recognise the way this unfolding debate is historically situated at a particular juncture in what we call 'biotic politics'. That is, AMR has become a medium for the expression of a prevailing cultural ambivalence about hygiene, dirt, nature, infections, bugs and the non-self or immunitary 'other'. The debate has become a fundamental part of an imaginative space precariously suspended between 'working with' and 'working against' nature (Braun 2014), between immunitary 'fortification' and 'disarmament'. It has, it seems, become possible to detect in debates on AMR the potential for a transition or shift from a hygienist to a potentially 'post-hygienist' politics. Might there be cultural room for rethinking the future role of antibiotics, toxins and pesticides, as well as infectivity, bugs, parasites and the microbiome? In AMR, it has become possible to discern how the sterility logics of the last century have 'recoiled' autoimmunitarily in the present. As we go onto explore, rhetorically at least, antibiotics once promised a 'golden age' which would, in the words of one much cited early commentator, lead to the '… virtual elimination of infectious disease…' (Burnet 1953). However, the technical logics of large scale and widespread antibiotic use have instead rendered many of them increasingly ineffective. Conceptually, much of the recent biopolitical literature on the politics of immunity is laced with this potential for a 'new settlement' between the human and the microbial.

Immunitary perspectives: AMR and the anticipatory imaginary

Before turning in detail to literature on the biopolitics of immunity and immunitary theory, we first want to articulate some of the wider intellectual terrain through which AMR has be approached. Sociologists have contributed to an understanding of antibiotic resistance through empirical studies on prescribing from the perspectives of practitioners and patients (Broom et. al. 2014). Some attention has focused on the media framing of the AMR in the public understanding of science (Brown and Crawford 2009; Nerlich and Halliday 2007; Nerlich and James 2009). Lee and Motzkau (2013) articulate alternative biosocial imaginings of antibiotic resistance. Landecker (2015) offers a critical reversal of the history of biology to a biology of history in seeking to underscore the 'materiality of history and the historicity of matter' in AMR. Our work seeks to extend these more recent debates but with an emphasis on the past and future temporal tenses of infectivity and biosecurity (Braun 2007; Hinchliffe and Bingham 2008; Dillon and Lobo-Guerrero 2008). Here we are particularly interested in the role of anticipation (Cooper 2006; Anderson 2010), threat and motifs of the future and the past.

Cooper (2006) writes of a 'turn' taking place in recent decades towards the securitisation of the future through pre-emption, an anticipatory biopolitics preoccupied with suspicions, fears and panics. She re-articulates the received narrative of a successive series of shifts starting with a sense of the unassailability of infectivity in the early twentieth century; then to a period of antibiotic efficacy and the idea that a final 'truce' had been reached between ourselves and infectious disease; to more recent notions of an 'insurgency' and the biotic 'comeback'. AMR registers an evolving immunitary dialectic, an iatrogenic recoil in which our defences are responsible for frighteningly invisible threats. 'Friends were turning against us…' she writes, and '… the immunological self was misrecognising itself (auto-immune disease); our most promising cures (antibiotics) were provoking counter-resistances… ' (2006, 115). A biotic politics of fear has seeded an '… alertness to the advent of the unpredictable', a 'speculative warfare' that articulates with a wider calculus of 'catastrophe risk'. This is without continuity with the past and made worse by the invisible elusivity and indiscernible uncertainty of what it is that is threatened (*ibid*). The 'worse that is to come' (Derrida 2003) is a catastrophe that we apprehend or imagine without the proportional perspective of assessment or calculation. Towards the end of this paper, we want to return again to Cooper's thoughts on recoil and think about connections to Derrida's writing on autoimmunity, especially in thinking about the particular kinds of future logics embedded in the unfolding policy trajectories of AMR.

As we discuss below, the motif of a 'return to the dark ages' expressed by Cameron articulates with other temporal registers evident in the context of biotic politics. Nerlich and James (2009) compared biosecurity and climate change reflecting on the consequences and implications of a potentially 'alarmist' microbiological discourse. They focus on the motif of the 'post-antibiotic apocalypse' and draws on a 'sociology of (disastrous) expectations' to critically question whether catastrophism is a successful strategy for persuasion. Or

whether, instead, dystopianism constitutes 'discursive overbidding' (Weingart 1998) that seeds demotivation and alienation?

The question about AMR however also necessitates that we take seriously the lively materialities of the biotic. For Hinchliffe and Bingham (2008), biosecurity is infused with the deferred and latent indeterminacy of futurity where security is made 'frighteningly unpredictable' by the global flow of biomatter (*ibid*; Hinchliffe and Ward 2014; Davis 2005). Myths of complete control are continually subverted by the leaky disorderliness of constantly evolving microbiological life. Totalising logics are therefore inescapably impure in an environment populated by 'invasive' species, novel pathogenic strains, migratory 'pests' and diseases. Anticipation, fear and future preparedeness have become the primary dimensions of the biopolitics of security and drive of a whole swathe of securitisation measures and initiatives interlaced within what Anderson and others identify as a 'politics of affect' and 'pre-emption' (Anderson 2010). Biosecuritisation operates then within a future 'invocative tense' (Cooper 2006) constituted through alertness, preparedness and vigilance.

This self-defeating dialectics of security articulates strongly with writing in the biopolitics of immunity. Sloterdijk reflects on the consequences and implications of fortified immunitary microspheres of technological securitisation. Here, antibiotics represents a biological version of wider technologies and spatial architectures, of 'spheredependence' (2011). Sphere-building segments individuals from a shared political and ecological environment. Such protections offer false security and ultimately contribute to the greater likelihood of ecological risk taking shape globally in the absence of a more permeable bodily politics.

For Sloterdijk the future becomes questionable because of the threatening boundlessness of contemporary globalization. The 'unthinkability' of globalized space leaves infinite scope for the subject to speculate upon exposure to defilement and contact with others. These processes fracture life giving rise to a mushrooming of individualized interior spheres replacing the previously public. The core problematic for Sloterdijk is the tension between two countervailing pretensions with regard to the world. *Homo habitans* travel, navigate, move and occupy. And yet they inhabit a system of values structured through protection, impermeability, fortification and inviolability. He focuses on the relationship between immunity and species interlinked immunitarily to one another. The mutual ecology of species is therefore more accurately expressed as an ecology of immunities, of permeable boundaries in which the fortunes of one are linked to those of another. This attention to immunitary ecology is highly prescient in a context where, over recent decades, given biosecurity attention to transpecies contagion and forms an important backdrop to the role played by antibiotics in structuring the evolutionary and political life of the biotic.

Esposito traces immunity etymologically to the *munus*, the communal indebtedness of obligation and gift. Where communitas '… opens, exposes, and turns individuals inside out…' immunity '… returns individuals to themselves, encloses them once again in their own skin' (2012, 49). His project is to

document the ascendency of the modern 'immunitary paradigm', the impulse towards the boundaried securitisation of the individual, the state, etc. At certain limits however, such defences cease to be benign and instead become thanopolitically toxic, literally so in the case of antibiotics.

Ed Cohen is similarly interested in those dimensions of immunity that are fundamentally in tension with the dominant discourse of biopolitical individualism. The immune system as defence metaphor is highly unstable and vulnerable to violation. Cohen articulates the what he calls a 'co-immune system' (2009) to describe the interpenetrative porosity of immunity. Immunities are far from totalizing and are instead highly plastic. What room is there, asks Cohen, for versions of the self that are naturally and normally much more 'mixed up' and which subvert immunology's self-non-self framework of categorical violation? Autoimmunity, the microbiome, the parasitic, infectivity are important opportunities for rethinking the other, just as we might rethink the 'bacteria that inhabit our guts and without whom we are just dead meat' (Cohen 2004 10).

But it is Derrida who is probably the most prominent in writing of immunity and especially autoimmunity as a cause of terror, a 'frenzy of position-taking' that ultimately vaporizes in a haze of self-contradiction. He also provides an important reference point for thinking about a contemporary biological age marked by globalized heterogenisation where immunities are exposed to transformation, reinvention and travel. The paradox at the heart of politics for Derrida is that the act of immunity cyclically recoils and attacks the very principles, practices and technics of defence. That is one destroys oneself through the very act of protecting oneself. Autoimmunity is driven by a cultural and political defensive insecurity marked by the imagined and real impending threat of terror. 9/11 is a catastrophic punctuation of traumatic vulnerability that results in a further autoimmune cascade of self-destructivity. Autoimmunity is a '… strange behaviour where a living being, in a quasi-suicidal fashion, 'itself' works to destroy its own protection, to immunize itself against its 'own' immunity' (2003, 94). Crucially, for Derrida immunity is an imaginary psychic pretence, a future-projected means of denial through which the threat can be concealed, becoming therefore more dangerous because of its repression. Further into our paper, we consider these thoughts in the context of a prevailing discourse of 'sleepwalking' back into 'the dark ages of medicine'.

Immunity is temporally orientated to the future, specifically a deferred or latent imaginary. The catastrophic trauma of one's immunity being breached in the present, haunts into the future, such there is always an imagined 'worse to come'. It is this anticipatory catastrophism that lays the foundations for a cycle of auto-immunitary excess. Whilst the present is somehow constrained, the imagination is capable of entertaining the possibility of '… repetition to come - though worse. Traumatism is produced by the future, by *the to come*, by the threat of *worse to come*, rather than a threat that is over and done with" [our italics] (Derrida 2003, 97). That which cannot be entirely foreseen cannot be entirely contained or limited. The same boundless imaginary that makes it possible to falsely conceive of an inviolable self in the present, gives rise to a more powerful and self-defeating prospect of threat in the future. The repetitively replayed and

endlessly rehearsed paroxysms of the twin towers attacks are part of a ubiquitous catastrophic spectacle. But the 'worst' resides in those catastrophes that cannot be seen and whose agents are less visibly recognisable, the 'insubstantial, fleeting, light and so seem to be denied, repressed, indeed forgotten…' (2003, 99).

In what follows we want to return to the two political moments which serve as comparative focal points for our analysis of the evolving AMR debate. The interventions of Howard and Cameron offer empirical entry into the dominant political and policy context through which AMR is varyingly performed at particular times and places. The decade that separates 2004 and 2014 offers a convenient timeframe through which to explicate the varied futures and imaginaries pre-empted through notions of infectivity and resistance. It is important to recognise that these futures are themselves dynamic and evolving across time. Whilst we will focus below on Cameron's recent coinage of the 'dark ages' motif, we begin by revisiting Howard's earlier efforts in putting AMR to political work. In so doing, we pay particular attention to the futures and pasts brought into play through these interventions. We also reflect on links between a 'politics of resistance' in AMR and that of the wider political and biopolitical agendas of economy, what might be called 'economic imaginaries', but also questions of race and migration.

'Remember the 'British Disease''?

Howard's intervention is located in the bitter political and media campaign leading up to the 2005 UK general election. It is in the context of the perceived battle between an incumbent labour administration and an arch-thatcherite opposition that Howard fastens onto 'superbugs'. In September of 2004, Howard makes his now famous speech in which he casts hospital infections as pathologically symptomatic of a national malaise within caring institutions and indeed Britain as a whole. 'Do you remember the "British Disease?"…' Howard asks, 'It once described Britain's economic and industrial weakness when the trade unions were out of control. The last Conservative government cured it. Today, there is a new British disease. But this time it is in our hospitals…' (*The Guardian* 22nd Sept 2004). It is in this speech that the opposition leader recalls the powerful moniker of Britain as the 'sick man of Europe' reviving memories of the 'English disease' and the nation's industrial decline.

MRSA here provides an opportunity for Howard to redeploy a powerful trope threatening the dystopian prospect of a return to unionised industrial conflict. But it also naturalises the idea of a pathological infectious contaminant in British politics and institutional life. In AMR we have an obvious interweaving of the organic and political body. This was a potent neologistic formula previously deployed by Thatcher when famously arguing that 'to cure the British disease with socialism was like trying to cure leukaemia with leeches' (Thatcher 1993, 38). Sickness became establishment shorthand for unionised resistance, archaic relics of a past swept aside by the neoliberal promise of public sector reform and market fundamentalism. Later into the campaign, the Government's Health Secretary would reversed Howard's pathologisation of Britain, arguing '…his

[Howard's] speech is not a serious attempt to deal with curing the ills of NHS patients. It's a desperate attempt to cure the ills of the Tory party' (BBC 2nd Sept 2004).

The speech is littered with reference to 'superbugs' and calls for a 'national outcry' on a scale faced in earlier crises. It ridicules Labour's measures to tackle MRSA and especially Department of Health recommendations on mundane hand washing. Instead, the measures that will eradicate resistant infections are Conservative reforms especially 'consumer choice'. Microbial resistance will be purified from the British body politic only through competitive market logics which drive standards of cleanliness up resulting from newly constituted healthcare consumers exercising their right to choose: '…The superbug is a British disease. The Right to Choose is the cure' (*The Guardian* 22nd Sept 2004). Howard's target is also the resistant 'superbug' of 'red tape' and 'paperwork', the interfering bureaucracy of left wing 'centralisation' and the lack of 'freedom for the professionals who know best…' (*ibid*).

In this particular political expression of the AMR debate, the past serves more than a dystopian purpose. The past also references the nostalgic sentiments of hospitals having once been comfortingly clean sanctuaries of security. Both sides of the political divide championed a reinvigoration of the role of the hospital matron as a much needed source of orderly authority and starched cleanliness. But Howard's campaign is quick to make the return to the days of the matron a 2005 manifesto pledge. Matrons nostalgically reference back to a 'golden age' (Crawford et al 2008) or 'the good old days' (Barrett 2003) of healthcare 'spotlessness' (Snell 2001).

Crucially, is a crisis breaking out in the welfare state's pre-eminent institution. Hospitals have become contaminated spaces where poor hygiene, dirty facilities and declining standards are endemic. Whilst it is important to take note of what is in Howard's many interventions on the question, it is just as important to note what is also left out. For example, there is little mention that one arrives into hospital already infected. In clinical and popular discourse during the period, there are frequent references to the patient as an asymptomatic carrier of Strep (Condrau and Kirk 2011). But the over-riding political discourse of the time is one of hospital filth infecting hapless patients (Crawford et al 2008). Howard's omissions point to patients as embodiments of microbial sterility. Nor does it serve Howard's political agenda to make very much of over-prescribing and compliance. So 'resistance' in the AMR sense is largely absent here, and is instead largely confined to the clinical literature.

Hospital infections played well into a pre-election politics of fear. Howard's much cited speech in the month leading up to the election pre-empts a future stemming from a present in which '… taxes are up, crime up, immigration up, waiting times up, MRSA up, take home pay down, pensions down, productivity growth down, manufacturing employment down' (*Telegraph* April 7th 2005). MRSA had become fiercely fought over territory with the Conservative opposition having the upper hand on an number of agendas in addition to hospital infections, particularly immigration and crime (Wring 2005).

It is crucial not to treat AMR in political isolation but to recognise the way it sits alongside companion political agendas. Howard's election bid for the premiership was driven by the election strategist Lynton Crosby who was said to have sounded a 'dog whistle' on immigration. Years later, 'Sir' Crosby would repeat this strategy to the advantage of the 'leave' vote in the 2016 UK EU referendum. Relatively little attention had been given in the election to obvious mainstream issues like housing, education and transport. Instead, attention tended to concentrate on the interchangeable anxieties of immigration and 'superbugs'. Crosby's appointment had been seen to shift the campaign towards 'symbolic issues' (Wintour 2005), principally hospital cleanliness and immigration.

This was also a moment in which those on the more 'extreme' fringes of British politics were busy trying to fuse race, immigration and hospital infections. *Sunday Mirror* reporters had infiltrated the British National Party their claims that immigrants were the primary cause of MRSA (23rd May 2004). In February of 2005, the Conservative opposition announced manifesto plans to impose the compulsory screening of migrants prior to departure from their countries of origin. Our main point here is that there was a relatively receptive space during this period the biopolitics of race and infectivity to be brought together (Renton 2005). This was a politics which positioned 'immigrants as vectors of disease' (Craig 2007, 273). MRSA espressos a pre-emptive turn towards a discourse of future bio-securitisation (Cooper 2006) preoccupied with a threatened body politic. A spiralling decline into dirt and pollution becomes the principal platform for the portrayal of a post-infective future society cleansed its debilitating maladies.

A return to the dark ages

Moving forward almost exactly a decade to early July of 2014, the then British Prime Minister and Conservative Party leader, David Cameron, sketches out the dystopian epochal threat of a 'return to the dark ages of medicine' (BBC 2nd July 2014). Being 'cast back' was widely taken up in the media and in parliamentary political debate. One parliamentarian commended the Prime Minister for taking the 'international lead', and that '…increasing the unit price of antibiotics and tackling their growing misuse in developing countries is absolutely vital if we are not to face a return to the medical dark ages' (Sturdy MP, House of Commons, 15.7.14). The *Financial Times* led the story with the headline 'Keep medicine out of the dark ages' (2nd July 2014). Channel 4 news took a more mocking tone asking 'Is David Cameron about to save the world?' (Channel 4 News, 2nd July 2014).

The 'dark ages' forms a grammar of periodization for the AMR debate which articulates with a number of epochal motifs including frequent references to the 'golden age of medicine', 'modern medicine', 'civilisation' and 'the coming apocalypse'. The role of antibiotics in overcoming infections is positioned as the measure and benchmark of 'modern medicine': '… we are losing our antibiotics

to resistance, and effectively losing modern medicine as we know it… if we do not take action, deaths will go up and up, and modern medicine will be lost' (Goldsmith MP, House of Commons, 15.10.14). The situation is described as 'frankly horrifying', a 'horrific scenario' (Sturdy MP, House of Commons, 15.10.14).

It is important not to overlook the racial politics in Cameron's focus on the market. Resistance in policy discourse is ubiquitously attributed to developing countries, further entrenching a post-colonial othering whereby immunological threats are seen to move from without to within (Brown and Nettleton 2017), positioning 'foreign' peoples as sources of contagion and virulence (Wald 2000; 2007). In everyday understandings of infectivity, confidence is often placed in one's own immunity, but not in that of 'others' (Martin, 1993). As Esposito might put it, the internal 'within' of *immunitas* is maintained through the threat of imagined violation, an imagined 'spatiality of biopoliticised flesh' (2008 160). Beyond formal politics, the dark ages reference triggers widespread subpolitical xenophobic reactionary social media activity. The following comments are illustrative of just some, barely publishable, online posts to a tabloid feature covering the dark ages story (*Daily Express* 2014):

> Steveuk57: This is just a distraction from … exit from the EU and immigration. Put a stop to these two and we might… control who comes into the UK and the diseases they carry.
>
> ycjarman: The Dark Ages have been imported from other Countries - muslims are still living in The Dark Ages and trying to inflict it upon the rest of us - Bacteria and muslims same outcome!

The apocalypse metaphor had earlier surfaced in January of 2013 with the UK Chief Medical Officer, Dame Sally Davies, warning of a 'looming antibiotic apocalypse' (BBC 24th January 2013). But Cameron's intervention and reference to the 'dark ages' reinvigorated political and policy attention and shifted AMR's metaphorical register. While the notion of a return to the dark ages was fairly new in political discussion, the apocalyptic metaphor had been circulating for some time (Nerlich and James 2009). Similar articles played on Kubrick's cinematic title satirising its alarmism: 'No apocalypse now' (Goldstein and Kitzis, 2003) and 'Apocalypse soon?' (Gratzer, 2003).

A piece in *The Lancet* questioned the permanent state of emergency bubbling up around resistance: 'The end is believed to be nigh… but this is a protracted condition rather than a terminal event, a state that looms but never happens. It is a case… not of 'Apocalypse Now', but of 'Apocalypse from Now On' (Fitzpatrick 2003). The apocalypse becomes part therefore of an endless deferment to an always latently disastrous future. AMR become an easy canvass for the projection of wider existential insecurities echoing Sontag's writing on synthetic 'fantasies of doom' (1989). Whist the apocalyptic is clearly then a key feature of the framing of AMR in the 2000s, Michael Howard's dystopianism had been domestic rather than doomsday, a matter of dirty hospitals, patient choice and matrons rather than eschatology.

Medicine's 'dark ages' is frequently used as an index of progressive advancement. From the 1950s antibiotics are expressed in exactly these terms, bringing to an end the deep history in which infections dominate human life (Morphy 1950; O'Brien 1957). A 'return to the dark ages' surfaces in related early debates about the ecological impact of petro-chemical pollution. Carson's eponymous *Silent Spring* (1962) is chided shortly after its publication by the chemical industry spokesperson Robert White-Stevens on CBS television: '… if man were to follow the teachings of Miss Carson, we would return to the dark ages, and the insects and diseases and vermin would once again inherit the earth' (in Kroll 2001, 409). The statement became a memorable moment in the evolving debate about the risks of agro-chemicals. From around this time, modern molecular chemistry and antibiotics becomes linked to the dystopic possibility of 'a return'. For Gray, antibiotics become just one of many indices of unidirectional advancement: '… anyone who dares question the idea of progress is at once accused of whishing a return to the Dark Ages' (2004, 9).

The 'dark ages' therefore links the ecological politics of pesticides to the recent medical and environmental politics of antibiotics. For White-Stevens, the harms to which *Silent Spring* bears witness are justifiable by-products of large-scale agro-industrial production. Modernity necessitates hermetically insulated protection from those threats preventing humans rather than 'vermin' from 'inheriting the earth'. Carson instead questioned the imagined existence of the immunitary boundary between humans and vermin. Rather, 'ecocide' is seen to come full circle and envelope all life in a non-binary ecology (1962, 19). Carson and White-Steven respectively represent an exemplary collision between 'living against' and 'living with' (Braun 2014). This becomes important when, below, we explore what Cameron envisages will avert a return to our medieval past.

The first direct reference to the prospect of a 'return' connected to AMR dates from around the mid 2000s. The 'shadow epidemic' states that 'our interconnected, high-tech world may find itself back in the *dark ages of medicine* [our italics], before today's miracle drugs ever existed…' (Alliance for the Prudent Use of Antibiotics 2005, 7). A 2008 paper fuses militaristic and epochal metaphors: '… the age of antibiotic therapy has come to an end. … we have struggled in a ceaseless war with resistance where bacteria have adapted quickly … threatening a return to the 'dark ages' of the pre-antibiotic era…' (Dale-Skinner & Bonev 2008, 40).

In debate following the speech, the 'return' is often expressed through the metaphor of 'sleepwalking back', a semi-conscious state of temporal regression to something forgotten or unacknowledged. The somnambulist hovers in a state of low awareness performing activities normally only undertaken when awake. The automatism of the sleepwalker prevents them having an awareness of their actions, until the moment one discovers oneself to have been, or become, a sleepwalker. Debate around Cameron's speech frequently picks up on an earlier statement by the head of the Wellcome Trust 'We are sleepwalking back… The golden age of medicine is behind us' (BBC Radio 4 2014). The whole discussion around sleepwalking turns on questions of having both known and yet not

known the likelihood of resistance systemically evolving to 'outpace' the antibiotic age. The recollection that early chemotherapeutic 'pioneers' had written extensively on the inevitability of resistance is an important backdrop to the somnambulistic metaphor. In other words, we have always known. References to the 'golden age' become a reminder of naivety.

This toing and froing across historical tenses is typically configured through the play of historical memory and projection (Brown and Michael 2003). The 'retrospection of prospects' includes Fleming's now much cited awareness that strains of bacteria would out-evolve the antibiotics targeted at them: '…. there is the danger that the ignorant man may easily underdose himself and by exposing his microbes to non-lethal quantities of the drug make them resistant' (1945, 93). Or by contrast, the retrospection of prospects might include overstated claims that we had left infectivity behind, claims now roundly judged to have been hubristic.

Retrospections and sleepwalking play a crucial role in accounting for the borders between accountability and irresponsibility in AMR. The AMR future is also performed through the 'prospection of retrospects' (Brown and Michael 2003), the way expectations and imaginaries are deployed in the real-time present to construct or avert potential futures. This would include the mobilisation of cultural historical memories embedded in motifs like the 'dark ages', 'the coming plague', 'the apocalypse', etc.

In thinking about sleepwalking, it is worth returning to Derrida for whom immunity is a psychic pretence that something purposeful has been done to stave off threat. Immunity induces, a denial in which threat is concealed becoming therefore more powerful because of its repression. The dangerousness of the imagined trauma remains a fretful source of underlying anxiety giving rise to self-fulfilling catastrophism. For Derrida, immunitary devices (border checks, hand sanitisers, antibiotics, etc.) are constantly unwelcome reminders of the likely future 'return' towards the very source of peril.

The question of the visible and the invisible, the present and the future respectively, is crucial here. For Derrida, it may have been possible to 'see' catastrophic events coming were it not for the very immunitary systems that prevent us 'seeing' the unthinkable. Far worse, Derrida points out, are those traumas that cannot and will not be 'seen' and whose dimensions are more difficult to fix or limit. The real immunitary terrors that await us in the future are invisible. Imperceptibility is the root of future terror. The foundations of dread are to be found in the charade of an imagined purity, the pretence of an uncontaminated frontier. The 'worse to come' is that which awaits us in a barbarous hinterland beyond the borders of our immunity, something upon which we can speculate, but not know.

Discussion – Bio-economic Imaginaries

Taken together we have two very different political interventions at seemingly different junctures in the unfolding of the AMR question. And yet despite the differences in language, metaphor and rhetoric, both of these moments turn on a very similar underlying logic. Both reflect a neoliberal free market agenda for whom the crux or crucible of biotic politics lies in the promise of the market. For Cameron, threat of AMR necessitates renewed antibiotic vigour announcing. He appoints Jim O'Neill to advise on the 'development of a new generation of antibiotics', rekindling the 'dwindling pipeline', 'providing an effective incentive for pharmaceutical companies' and correcting 'market failure' (BBC 2014). O'Neill famously is a monetary economist specialising in global currency markets who coins the acronym BRIC.

It is important then to observe the evolution of policy priorities surrounding resistance in the period Howard and Cameron attach themselves to the biotic. There is a very clear redefinition of the problem whereby policy tilts towards the need for a new economic structure to bring new antibiotics to the market. Leading up to the 2005 election campaign, the UK Government published its first Antimicrobial Resistance Strategy and Action Plan (Department of Health 2000). The report had a number of key aims including surveillance, reduction and hygiene with little emphasis placed on the need for a 'new generation' of antibiotics. As recently as 2014 a key UK Government strategy makes fourteen recommendations only two of which concerned the 'economics of new antibiotics' (Department of Health 2014). The committee compiling the 2014 report seemed caught off guard by Cameron: '…while this report was being drafted the Prime Minister announced an independent review to '… explore the *economic issues* [our italics] surrounding antimicrobial resistance…' (Science and Technology Committee of the House of Commons 2014, 1). In comparable terms the WHO reports of 2001 and 2012 similarly place their emphasis on rational prescribing listing new molecule 'innovations' last in a series of preferred options (WHO 2012, 2).

For both Cameron and Howard, the biotic has become the promissory medium for 'economic imaginary' performing modes of imagining and projecting visions of the proper workings of economy. This might include the discourse of 'free choice' exercised by patients newly positioned as consumers, or re-engineering the market motivations of the pharmaceutical industries. Economic imaginaries also become attached to and articulated through cultural systems of knowledge, like the immune system, or bacteria, but also institutions, like hospitals, government and commercial multinationals. In taking the form of an economic imaginary, AMR extends the extent to which the immune system becomes a vector for the political and moral economies of business, security, class and race (Martin 1994).

In both of the political instances explored here, 'resistance' itself becomes a suitably apposite metaphor for the simultaneous articulation of both microbial and economic imaginaries. For Howard, the source of resistance is an apparent refusal to institute consumer choice, together with the barriers to market capital presented by bureaucratic and regulatory constraint. Here 'the market' butts up against the resistant hurdles of public sector inefficiency. For Cameron, the

source of resistance is also to be found in the market. But this time, the barriers to capital lie in the 'failure' of the public sector to provide the correct incentive structures to attract pharmaceutical investment. Overcoming resistance lies in finding news ways to push through, to create new market principles to reinvigorate the profit motive. The answer lies in new mechanisms of price setting and up-front public investment.

Nor is the rationale necessarily to reduce the use of antibiotics, rather we need to 'up our game' by getting medicinally ahead of microbial evolution if we are not to be left trailing behind the capacities of the biotic to out-innovate, to out-compete, to out-resist us. Cameron, either intentionally or not, skips over the causal link between antibiotics and microbial resistance. And its this missing element, this lacunae, that runs as a common thread across the decade that separates the interventions of Howard and Cameron.

To what extent therefore do these futures articulate with an immunitary biopolitics of 'working with' or 'working against', and of the possibility for a 'new settlement' with infectivity that goes beyond the hygienist logics of sterility? In thinking about this it is worth exploring further the potential promise of autoimmunity. For Derrida and Cohen, it is through autoimmunity that the self-non-self configuration unravels to create the opening for alternative and potentially more liveable meanings of infectivity. Derrida's deconstructive perspective shares with Cohen this attempt to disentangle the foundations of contemporary hygienist politics and their naturalisation. 'Autoimmunity becomes anathema', Cohen writes, '… not just because it wreaks havoc in human bodies but also because it confounds the political ontology that underlies our entire way of life' (2004, 9).

Autoimmunity is an unsettling reminder that the body of the person 'is and is not itself'. Such reminders are then opportunities, openings to new biopolitical arrangements of self and other. Esposito cites Durkheim's remark on vaccination where '… damage caused by the sickness is insignificant compared with the immunities that it confers upon us… ' (in Esposito 2008, 48). Immunitary protection therefore depends paradoxically upon a requirement to relinquish a hermetically sealed self so that '… in order to be saved, life has to give up something that is integral to itself' (2008: 59). 'Infectivity' and 'autoimmunity' become affirmative biopolitical futures with which to productively engage with the terrifying possibility that the self is less unified than we might like to imagine. As Derrida puts it '… the most irreducible source of absolute terror… comes from 'within,' from this zone where the worst 'outside' lives with or within 'me.' My vulnerability is thus… without limit. Whence the terror' (2003, 188).

The reinvigoration of our antibiotic defences differs markedly from these possibilities and instead errs towards an extension of the antibiotic sterility logics discussed above. The more recent economic turn in AMR projects the underlying immunitary binary of the chemotherapeutic bioeconomy into an endless future. Autoimmunity becomes a cause, not for less 'aggressive', but more strident antibiotic stratagems. Contrary to the possibility of a 'new

settlement' with the biotic, the self-defeating contradiction of autoimmunity is repositioned as the basis of new 'anti'-biotic exploitability. Resistance is not to be overcome but turned into a perpetual engine of commercial opportunity. Capital does not transcend resistance but instead absorbs the very principle of resistance into itself. Resistance is not to be transcended but appropriated by stringing successive resistances into an endless cycle without ever having to 'overcome' as such.

Cooper similarly charts the way US federal research funds were redirected to rescue a dwindling biotechnology sector in the aftermath of 9/11 resulting in a new catastrophism-fuelled fusion of bio-defence and infectious disease research. The pattern is not entirely dissimilar to an economic imaginary in which new arrangements of cross-subsidisation might emerge between public health services and the pharmaceutical sector in the production of a 'new generation' of antibiotics. Resistance is reconfigured from existential threat to commercial opportunity, a way of repositioning the idea that 'there is no end to danger' (Cooper 2006, 128) and even that 'there is worse yet to come' (Derrida 2003). Indeed, overcoming would choke off the future 'conveyor belt' and 'pipeline' of resistance's value.

The ultimate gift to capital from the microbiotic is the ceaselessness of its adaptation to small and temporary efficacies of successive generations of antibiotics. The futility and fatalism of constantly being 'outpaced' becomes the very foundation of the future anti-microbial market. This tilt registers a shift in focus from the biotic towards its resistance. But the logic of Cameron's trajectory is neither to exile nor to eradicate, it is instead to bring resistance home within the borders and margins of economisation.

The underlying principles of AMR are akin to the market in regenerativity where the very engineered reproducibility of life becomes a means of rekindling industries otherwise dependent on finite and exhaustible resources (Waldby and Mitchel 2006). As Cooper notes '… the only way to survive the future is to become immersed in its conditions of emergence, to the point of actualising it ourselves…' (2006, 125). Catastrophism around the thing that is feared or pre-empted becomes, itself, a new source of 'anticipatory evolution' even to the extent of hastening and actualising the very thing that is feared, resistance. In other words, the AMR imaginary becomes a means of limitless invocation fuelled by the repressed dread of a future return. Where 'living with' the biotic weakens the market, 'living against' perpetually projects the market into the future.

References

Alliance for the Prudent Use of Antibiotics (2005) *Shadow Epidemic*, http://react.test.phosdev.se/uploads/publications/other-publications/shadow-epidemic-the-growing-menace-of-drug-resistance.pdf [accessed: 1/10/2015]

Anderson, B. (2010). Preemption, precaution, preparedness: Anticipatory action and future geographies. *Progress in Human Geography*, 34(6), 777-798.

Anderson, B. (2012). Affect and biopower: towards a politics of life. *Transactions of the Institute of British Geographers*, 37(1), 28-43.

Barrett, D. (2003) Will modern matrons carry on regardless? *Journal of nursing management*, 11, 144–146.

BBC (2004) *Tories pledge to tackle superbug*, 2nd Sept, http://news.bbc.co.uk/1/hi/health/3620762.stm [last accessed 1/10/15]

BBC (2014) Antibiotic resistance: Cameron warns of medical 'dark ages', 2nd July, http://www.bbc.co.uk/news/health-28098838 [last accessed 1/10/15]

BBC (2013) Antibiotic 'apocalypse' warning, 24th January, http://www.bbc.co.uk/news/health-21178718 [accessed: 1/10/15]

BBC Radio 4 (2014) Antibiotic Resistance, *Today Programme*, 8th January.

Braun, B. (2007). Biopolitics and the molecularization of life. *Cultural geographies,* 14(1), 6-28.

Braun, B. P. (2014) A New Urban Dispositif? Governing Life in an Age of Climate Change. Society and Space 32: 49-64.

Broom, A., Broom, J., & Kirby, E. (2014). Cultures of resistance? A Bourdieusian analysis of doctors' antibiotic prescribing. *Social Science & Medicine*, 110, 81-88.

Brown, B., & Crawford, P. (2009). 'Post antibiotic apocalypse': discourses of mutation in narratives of MRSA. *Sociology of health & illness*, 31(4), 508-524.

Brown, N. & Michael, M. (2003). A sociology of expectations: retrospecting prospects and prospecting retrospects. *Technology Analysis & Strategic Management*, 15(1), 3-18.

Brown, N. & Nettleton, S. (2017 in review) Bugs in the Blogosphere: Immunitary moralism in anti-microbial resistance (AMR) *Social Theory and Health*

Burnet, F.M. (1953) *Natural history of infectious disease*. 2nd ed. Cambridge: Cambridge University Press

Carson, R. (1962). *Silent Spring*, Boston MA: Houghton Mifflin.

Channel 4 News (2014) Is David Cameron about to save the world, 2nd July, www.channel4.com/news/david-cameron-saving-the-world-antibiotics-resistance [accessed 1/10/15]

Cohen, E. (2004). My self as an other: on autoimmunity and "other" paradoxes. *Medical Humanities*, 30(1), 7-11.

Cohen, E. (2009). *A body worth defending: Immunity, biopolitics, and the apotheosis of the modern body*. Duke University Press.

Condrau, F., & Kirk, R. G. (2011). Negotiating hospital infections: The debate between ecological balance and eradication strategies in British hospitals, 1947-1969. *Dynamis*, 31(2), 385-405.

Cooper, M. (2006). Pre-empting Emergence The Biological Turn in the War on Terror. *Theory, Culture & Society*, 23(4), 113-135. Chicago

Cooper, M. (2008). *Life as surplus: Biotechnology and capitalism in the neoliberal era*. University of Washington Press.

Craig, G. M. (2007). 'Nation', 'migration' and tuberculosis. *Social Theory & Health*, 5(3), 267-284.

Crawford, P., Brown, B., Nerlich, B., & Koteyko, N. (2008). The 'moral careers' of microbes and the rise of the matrons: An analysis of UK national press coverage of methicillin-resistant Staphylococcus aureus (MRSA) 1995–2006. *Health, Risk & Society*, 10(4), 331-347.

Daily Express (2014) www.express.co.uk/news/uk/486225/Antibiotic-resistant-superbugs-threaten-Britain [accessed June 2016]

Dale-Skinner, J. W., & Bonev, B. B. (2008). Molecular Mechanisms of Antibiotic Resistance: The Need for Novel Antimicrobial Therapies. In Ahmad, I. and Iqil, F. *New Strategies Combating Bacterial Infection*, pp1-41, Weinheim: Wiley-Blackwell

Davis, M. (2005) *The Monster at Our Door: The Global Threat of Avian Flu,* New York, The New Press

Daily Mail, 17 October 2001)

Department of Health (2000) *UK Antimicrobial Resistance Strategy and Action Plan*. Department of Health. June http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4078448.pdf [accessed 1/10/15]

Department of Health (2014) *UK 5 Year Antimicrobial Resistance (AMR) Strategy 2013–2018 – progress report 2014* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/385733/UK_AMR_annual_report.pdf (accessed 1/10/15)

Derrida, J. (1999). Hospitality, justice and responsibility: a dialogue with Jacques Derrida.

Derrida, J. (2003) Autoimmunity: Real and symbolic suicides. [Trans P-A. Brault and M. Naas] In G. Borradori [Ed.] *Philosophy in a Time of Terror,* Chicago: University of Chicago Press.

Dillon, M., & Lobo-Guerrero, L. (2008). Biopolitics of security in the 21st century: an introduction. *Review of International Studies*, 34(02), 265-292.

Esposito, R. (2008). *Bios: biopolitics and philosophy.* Minneapolis: University of Minnesota Press.

Esposito, R. (2012) *Terms of the Political: Community, Immunity, Biopolitics*, New York: Fordham University Press

Fitzpatrick, M. (2003) Apocalypse From Now On, *The Lancet* 361(9365): 1310.

Fleming, A. (1945) Penicillin – Nobel Lecture. http://www.nobelprize.org/nobel_prizes/medicine/laureates/1945/fleming-lecture.pdf (accessed 1/10/15)

Goldstein, F.W. and Kitzis, M.D. (2003) Vancomycin-resistant Staphylococcus aureus: No Apocalypse Now, *Clinical Microbiology and Infection* 9(8): 761–5.

Gratzer, W. (2003) Apocalypse Soon?, *Current Biology* 13(3): 78–9.

Gray, J. (2004). *Heresies.* Granta books.

Hinchliffe, S., & Bingham, N. (2008). Securing life: the emerging practices of biosecurity. *Environment and Planning A*, 40(7), 1534.

Hinchliffe, S., & Ward, K. J. (2014). Geographies of folded life: how immunity reframes biosecurity. *Geoforum*, 53, 136-144.

Jamieson, M. (2015). The Politics of Immunity Reading Cohen through Canguilhem and New Materialism. Body & Society, 1357034X14551843.

Jessop, B., & Oosterlynck, S. (2008). Cultural political economy: On making the cultural turn without falling into soft economic sociology. *Geoforum,* 39(3), 1155-1169.

Kroll, G. (2001). The 'Silent Springs' of Rachel Carson: Mass media and the origins of modern environmentalism. *Public Understanding of Science*, 10(4), 403-420.

Landecker, H. (2015). Antibiotic Resistance and the Biology of History. *Body & Society,* 1357034X14561341.

Lee, N., & Motzkau, J. (2013). Varieties of biosocial imagination reframing responses to climate change and antibiotic resistance. *Science, Technology & Human Values,* 38(4), 447-469.

Martin, E. (1994). *Flexible bodies: Tracking immunity in American culture from the days of polio to the age of AIDS*. Beacon Press.

Morphy, A. G. (1950). Old Time in Medicine. *Canadian Medical Association journal*, 63(5), 507.

Nerlich, B., & James, R. (2009). "The post-antibiotic apocalypse" and the "war on superbugs": catastrophe discourse in microbiology, its rhetorical form and political function. *Public Understanding of Science*, 18(5), 574-590.

O'Brien, B. (1957). Respiratory disease in this century. *Irish Journal of Medical Science* (1926-1967), (11), 473-487.

Renton, D. (2005). 'A day to make history'? The 2004 elections and the British National Party. *Patterns of Prejudice*, 39(1), 25-45.

Science and Technology Committee of the House of Commons (2014) Ensuring access to working antimicrobials, www.publications.parliament.uk/pa/cm201415/cmselect/cmsctech/509/50904.htm (accessed: 1/10/15)

Sloterdijk, P. (2011)*Bubbles Spheres Volume I: Microspherology* Cambridge, MA MIT Press.

Snell, J. (2001) Thoroughly modern matron. *Health Service Journal*, 111 (5774), 28–30.

Sontag, S. (1989). *AIDS and its metaphors*. London: Penguin.

Sunday Mirror (2004) Pedlars of Poison, 23rd May,

The Guardian (2004) *Full text: Michael Howard's MRSA speech*, 22nd Sept. See: http://www.theguardian.com/politics/2004/sep/02/conservatives.uk [last accessed 1/10/15]

Thatcher, M. (1993) *The Downing Street Years*, New York: Harper Collins

The Telegraph (2005) Fighting talk as leaders clash, April 7th. See: www.telegraph.co.uk/news/uknews/1487283/Fighting-talk-as-leaders-clash-in-Commons-showdown.html [last accessed 1/10/15]

Wald, P. (2000) Imagined Immunities. *Cultural Studies and Political Theory*, 189-208

Wald, P. (2007) *Contagious: cultures, carriers, and the outbreak narrative*. Duke University Press

Waldby, C. (2006). *Tissue economies*. John Wiley & Sons, Ltd.

Weingart, P. (1998). Science and the media. *Research Policy*, 27(8), 869-879.

Wintour, P. (2005) How the Tories got back in the game, *The Guardian*, 24th Feb

Wring, D. (2005). The labour campaign. *Parliamentary Affairs*, 58(4), 712-724.

World Health Organization (2012), *The evolving threat of antimicrobial resistance. Options for action*
http://www.who.int/patientsafety/implementation/amr/publication/en/
[accessed 1/10/15]